

CLAIMS

1. An ozone gas sensing element characterized
2 by comprising:
3 a porous material and a sensing agent formed
4 in pores of said porous material; and
5 a light-transmitting gas selective permeable
6 film which covers a surface of said porous material,
7 wherein said sensing agent contains a dye
8 which changes absorption in a visible region by reacting
9 with ozone, and
10 said gas selective permeable film comprises an
11 organic polymer which uses, as a monomer, a compound
12 made of a chainlike molecule containing a vinyl group.

2. An ozone gas sensing element according to
2 claim 1, characterized in that said porous material is
3 transparent.

3. An ozone gas sensing element according to
2 claim 2, characterized in that said porous material is
3 made of glass.

4. An ozone gas sensing element according to
2 claim 3, characterized in that an average pore size of
3 said porous material allows penetration of said sensing
4 agent, and is less than 20 nm.

5. An ozone gas sensing element according to
2 claim 1, characterized in that said porous material is a
3 sheet-like material made of fibers.

6. An ozone gas sensing element according to

2 claim 5, characterized in that

3 said ozone gas sensing element contains a

4 humectant carried by said porous material, and

5 comprises an ozone sensing sheet formed by

6 dipping said porous material into an aqueous solution in

7 which said dye and said humectant are dissolved, thereby

8 impregnating said porous material with said aqueous

9 solution, and drying said porous material.

 7. An ozone gas sensing element according to

2 claim 6, characterized in that said ozone sensing sheet

3 is formed by dipping said porous material into an

4 aqueous solution in which said dye and said humectant

5 whose wt% is 10% to 50% are dissolved, thereby

6 impregnating said porous material with said aqueous

7 solution, and drying said porous material.

 8. An ozone gas sensing element according to

2 claim 6, characterized in that said humectant comprises

3 at least one of glycerin, ethylene glycol, propylene

4 glycol, and trimethylene glycol.

 9. An ozone gas sensing element according to

2 claim 8, characterized in that said humectant comprises

3 glycerin, and the wt% of said humectant is 30% in said

4 aqueous solution.

 10. An ozone gas sensing element according to

2 claim 6, characterized in that said solution is made

3 acidic.

 11. An ozone gas sensing element according to

2 claim 10, characterized in that said solution is made
3 acidic by at least one acid selected from the group
4 consisting of acetic acid, citric acid, and tartaric
5 acid.

12. An ozone gas sensing element according to
2 claim 10, characterized in that said solution is made
3 acidic by a pH buffering agent made of an acid and a
4 salt thereof.

13. An ozone gas sensing element according to
2 claim 1, characterized in that said monomer comprises at
3 least one of acrylic acid, acrylonitrile, methacrylic
4 acid, methyl methacrylate, vinyl chloride, and
5 vinylidene chloride.

14. An ozone gas sensing element according to
2 claim 1, characterized in that said organic polymer
3 comprises a copolymer.

15. An ozone gas sensing element according to
2 claim 1, characterized in that said organic polymer
3 comprises polymethylmethacrylate.

16. An ozone gas sensing element according to
2 claim 15, characterized in that a molecular weight of
3 said organic polymer is not less than 100,000.

17. An ozone gas sensing element according to
2 claim 1, characterized in that said dye contains an
3 indigo ring.

18. An ozone gas sensing element
2 characterized by comprising an ozone sensing sheet

3 formed by carrying a dye containing an indigo ring and a
4 humectant by a sheet-like carrier made of fibers.

19. An ozone gas sensing element according to
2 claim 18, characterized in that said carrier comprises a
3 sheet-like carrier made of cellulose.

20. An ozone gas sensing element according to
2 claim 18, characterized in that said ozone sensing sheet
3 is formed by dipping said carrier into an aqueous
4 solution in which said dye and said humectant are
5 dissolved, thereby impregnating said carrier with said
6 aqueous solution, and drying said carrier.

21. An ozone gas sensing element according to
2 claim 20, characterized in that said ozone sensing sheet
3 is formed by dipping said carrier into an aqueous
4 solution in which said dye and said humectant whose wt%
5 is 10% to 50% are dissolved, thereby impregnating said
6 carrier with said aqueous solution, and drying said
7 carrier.

22. An ozone gas sensing element according to
2 claim 20, characterized in that said humectant comprises
3 at least one of glycerin, ethylene glycol, propylene
4 glycol, and trimethylene glycol.

23. An ozone gas sensing element according to
2 claim 22, characterized in that said humectant comprises
3 glycerin, and the wt% of said humectant is 30% in said
4 aqueous solution.

24. An ozone gas sensing element according to

2 claim 20, characterized in that said dye comprises
3 indigo carmine.

25. An ozone gas sensing element according to
2 claim 20, characterized in that said solution is made
3 acidic.

26. An ozone gas sensing element according to
2 claim 25, characterized in that said solution is made
3 acidic by at least one acid selected from the group
4 consisting of acetic acid, citric acid, and tartaric
5 acid.

27. An ozone gas sensing element according to
2 claim 25, characterized in that said solution is made
3 acidic by a pH buffering agent made of an acid and a
4 salt thereof.

28. An ozone gas sensing element according to
2 claim 20, characterized in that

3 said ozone sensing sheet comprises a plurality
4 of ozone sensing sheets, and

5 said ozone sensing sheets are formed by
6 dipping said carriers into aqueous solutions in which
7 said humectants different in wt% are dissolved, thereby
8 impregnating said carriers with said aqueous solutions,
9 and drying said carriers.

29. An ozone gas sensing element according to
2 claim 20, characterized by further comprising a gas
3 amount limiting layer formed on a surface of said ozone
4 sensing sheet, and including a plurality of through

5 holes.

30. An ozone gas sensing element according to
2 claim 20, characterized by further comprising a gas
3 amount limiting cover formed to cover said ozone sensing
4 sheet, and including an opening in a portion thereof.

31. An ozone gas sensing element according to
2 claim 30, characterized by further comprising a gas
3 permeable film covering the opening.

32. An ozone gas sensing element according to
2 claim 20, characterized by further comprising a
3 light-transmitting gas selective permeable film which
4 covers a surface of said ozone sensing sheet,

5 wherein said gas selective permeable film
6 comprises an organic polymer which uses, as a monomer, a
7 compound made of a chainlike molecule containing a vinyl
8 group.

33. An ozone gas sensing element according to
2 claim 32, characterized in that said monomer comprises
3 at least one of acrylic acid, acrylonitrile, methacrylic
4 acid, methyl methacrylate, vinyl chloride, and
5 vinylidene chloride.

34. An ozone gas sensing element according to
2 claim 32, characterized in that said organic polymer
3 comprises a copolymer.

35. An ozone gas sensing element according to
2 claim 32, characterized in that said organic polymer
3 comprises polymethylmethacrylate.

36. An ozone gas sensing element according to
2 claim 35, characterized in that a molecular weight of
3 said organic polymer is not less than 100,000.